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A CASE

OF

ARTIFICIAL ANUS TREATED BY RESECTION
OF THE SMALL INTESTINE,

WITH

SOME REMARKS ON THE METHOD AND THE RESULTS
OBTAINED BY IT.

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THE case related below is of considerable interest as a very successful one of a comparatively new mode of treatment, up to the present time resorted to by continental surgeons only, with the single exception of a case reported by Mr. Kinloch from America. Attention will first be drawn to several points in the case, and then a brief reference will be made to the results obtained by the method, and such a comparison as is possible will be drawn between it and that of Physick and Dupuytren.

C. C—, æt. 21, was admitted into St. Thomas's Home, under the care of Mr. Edmunds, on February 21st, 1884. The patient had been the subject of right inguinal hernia since eight years of age; a truss had been worn seven years, but had been discontinued for the last six years, nothing having been seen of the rupture.

On February 19th the hernia came down after a fit of coughing, and neither he nor his doctor were able to reduce it. He vomited occasionally during the 19th and 20th, and an unsuccessful attempt was made to reduce it under chloroform.

At noon on the 21st his condition was the following. There was a very tense hernia on the right side. The tumour was marked by a constriction opposite the external ring. The skin was reddened from manipulation. There was much tenderness about the neck of the sac. He was restless, complaining of pain. Temperature 99.2° . The pulse was somewhat frequent. The tongue was furred and moist.

At 2 p.m. he had vomited once since admission. Ether was given, and herniotomy performed. The sac contained bloody fluid, and about five inches of highly congested small intestine, and some omentum. The gut was very dark, but still retained its polish. There was no lymph on the surface, and it bled readily. The stricture at the neck of the sac was divided, and the gut returned. The hernia was of the congenital variety. The neck of the sac was dissected out, the pillars were approximated by two silk sutures, and the wound closed. The operation was performed antiseptically, and a carbolic gauze-dressing used. The urine contained a trace of albumen.

During the next five days the progress was not satisfactory. He suffered with fever, the belly became distended, and, after the second day, he frequently vomited fæculent matter. The bowels did not act, although he passed flatus *per anum*. During this time he was kept under the influence of morphia.

On the evening of the fifth day a considerable amount of liquid fæces escaped from the wound.

During the next week, steady improvement took place. The discharge of fæces from the wound continued, and a daily motion was passed *per anum*. At this time some distension of the abdomen commenced, and on March 11th the following note was made: The distension of the belly is considerable. Fæcal matter has ceased to escape from the wound, and the bowels have not acted for four days. The belly is tympanitic; the coils of intestine are well marked out; there is dulness in the right iliac region. He has not much pain, but some tenderness of the belly. The patient was put under ether, and a probe was passed upward and outward in the line of the

inguinal canal, as far as opposite the internal ring, where it was cut down upon. The finger was introduced into the wound, and passed into the dilated intestine apparently in both directions. Several pints of liquid fæces escaped.

Gradual improvement followed the establishment of a free vent for the intestinal contents, faecal matter continuing to escape from the artificial anus, the bowels meanwhile acting irregularly.

On April 8th an attempt was made to close the artificial anus. The patient was etherised, the wound enlarged outwards in the line of Poupart's ligament, and the gut well exposed. The finger could be passed in either direction; and, as there was no spur-like projection from the mesenteric border, the edges of the gut were refreshed and brought together.

On the 10th faecal matter began to escape from the wound, and in a few days he relapsed into his old condition.

At this period, the patient being no longer able to pay the charges of the Home, he was transferred into the general wards; and, by the kindness of Sir William MacCormac, came under my care.

His condition on April 25th was the following: He was pale and very considerably emaciated, but cheerful, and anxious to have something done to relieve him. Although he took food well, the emaciation was progressive, the whole of the intestinal contents escaping by the artificial anus. There had been no proper action of the bowels since the last operation on April 8th. The artificial anus was situated one and a half inches above the centre of Poupart's ligament; it was about two inches in diameter, circular in outline, with sloping granulating walls composed of the whole thickness of the abdominal muscles. The mucous membrane of the intestine was slightly prolapsed at the bottom of the pit. The gut was firmly attached, and the finger could be readily introduced, passing, in one direction only, nearly directly upwards. An area of eczema, equal to one third of the whole abdominal surface, surrounded the opening, extending over the outer side of the right thigh. A constant discharge of intestinal fluid and semi-digested food, of a yellowish-green colour, took place; the fluid was frothy, and had a faint, sickly odour. The finger could be

readily passed into the upper end of the bowel, but the lower end could not be found.

The patient was kept for a week with a small shield applied around the orifice, from which he constantly mopped away the faecal discharge with a piece of absorbent wool; and in this way the condition of the surrounding skin was very materially improved.

The operation was fixed for May 3rd; and on May 1st the necessary preparation was commenced. He took his last meal at 8 p.m., but at the same time nutrient enemata were commenced, made of a drachm of pancreatic emulsion, two eggs, half an ounce of brandy, and three ounces of strong beef tea. These enemata were continued every four hours, to ensure his being in fit condition to bear the long operation. During the 2nd, the upper end of the bowel was irrigated four times with salieylie lotion until the fluid came away colourless. In spite of this preparation, bile-stained fluid was still escaping from the opening at 8 a.m. on the 3rd; he was therefore again washed out with salieylie lotion; and at 9 a.m. the operation was proceeded with.

Nitrous oxide gas was administered, followed by ether, and the operation was performed in the following manner: The wound was disinfected with 5 per-cent. carbolic lotion, and a piece of sponge attached to a string was passed for about two inches into the upper end of the bowel, to prevent escape of intestinal contents during the dissection. A vertical incision through the abdominal walls was carried upwards one inch and a half, and one inch downwards. The upper end of the gut was then dissected free from its adhesions; and when this was accomplished, the lower end was found lying quite parallel to and immediately below it. The upper end was about normal in size; the lower was contracted to the size of a pencil externally, with an opening large enough to admit a director. The lower end was covered with normal peritoneum. The gut was now provisionally clamped with the forceps to be later described, the two ends drawn forward, and a number of small sponges attached to strings were packed around them, so as to securely close the abdominal cavity. The small sponge was withdrawn from the cavity of the upper end of the intestine, and about one inch from the upper and two and a half inches from the lower extre-

mities was excised, together with a wedge of mesentery about four inches long by three-quarters of an inch in width. The cut surfaces then nearly corresponded in size. Many bleeding points had to be taken up in the mesentery, which was approximated with six silk stitches, and then the suture of the gut was proceeded with in the following manner: A first row of twenty-five very fine China-twist stitches were passed by a small curved needle, such as is used for suturing the sclerotic. These passed through the whole thickness of the gut, about one tenth of an inch from its free margin, commencing at the mesenteric border. They were tied in batches of five at a time, and then the second row of Lembert's peritoneal stitches were passed in the same manner. During the stitching, which took about three quarters of an hour, the gut was kept moist with warm salicylic lotion. The suture being complete, the gut was well washed, the clamps were removed, the sponges extracted from the abdominal cavity, and the whole was returned.

It was found impossible to bring the centre of the wound together, although lateral incisions in the skin were made to relieve tension; therefore only the upper and lower angles were closed, the intestine being left at the bottom of a deep pit, as before the operation. The granulations were shaved off, the whole wound dusted with iodoform, the cavity filled with iodoform gauze, a pine-wood bag applied, and the patient was removed to bed in fair condition, although the operation had lasted one hour and fifty minutes.

He rapidly recovered from the shock of the operation, and during the next thirty-six hours was kept constantly under the influence of morphia; he was sick twice, apparently the result of the anæsthetic, but complained of no pain. He had occasional hiccough. The tongue and lips were dry, but with no fur or sordes. The temperature did not rise above normal, pulse 120, of fair strength, resp. 20. The abdomen was moving well. The urine was scanty, high coloured, containing a little bile, strongly acid, no albumen, about twenty ounces in twenty-four hours.

On May 5th the wound was dressed. The main opening gaped, and on removal of the iodoform plugs, the intestine was seen at the bottom, covered with lymph; vermicular movements were visible. The wound was sweet and healthy-looking. The

sutures in the abdominal wall were removed. He passed wind *per anum*. On this day he recommenced his nutritive enemata, sixty-two hours and a half since the last, and eighty-nine hours since any food had been taken by mouth. Temperature normal, pulse 120, resp. 20. He had no pain or distension of the belly.

6th.—Progress was still quite satisfactory. The bowels acted yesterday, and once again to-day about two hours after an enema. He was ordered to have a teaspoonful of brandy and soda every hour. He still had morphia occasionally.

8th.—He began taking one teaspoonful of Brand's essence yesterday each hour, as well as the brandy and soda. The enemata were continued. The wound was suppurating and granulating healthily; the line of suture with one or two stitches was visible at the upper angle of the wound. His general condition was quite satisfactory.

10th.—The urine, which had been scanty and very concentrated, this night contained blood and one half albumen; specific gravity, 1026. Fluid had been increased to about half an ounce per hour. He had pain in the back. The tongue was clean and moist. He had no headache. Temp. 99°, skin dry, pulse 94, full.

The amount of fluid was now very much increased. The urine continued to contain blood, but in decreasing quantities, till midday on the 12th, when it disappeared. The urine contained numerous uric acid crystals and much free blood, but at no time casts of either blood or epithelium.

After this time the progress to complete recovery was uninterrupted; he continued the enemata till the 15th (after the 13th only three daily), and from that time all nourishment was taken by mouth. On the 19th bread and butter was allowed, and on the 28th ordinary mixed diet.

The healing of the wound was somewhat prolonged on account of the large depression which had to be filled with granulations; during the healing twelve of the intestinal sutures were discharged. There was never any trace of faecal discharge, and the wound remained sweet throughout. On June 3rd the pine-wood dressing was discontinued, and the superficial granulating wounds were dressed with sulphate of zinc lotion; on the 10th he got up, and on the 21st he was discharged cured, with a

spica bandage. The bowels acted regularly, and he felt as well as before he had had any trouble.

I saw the patient at the end of July. He had completely recovered his normal health, and looked well nourished. The bowels were acting regularly and he had no pain. A bubonocoele, which existed on the left side at the time of operation, was considerably increased in size, having now reached the upper part of the scrotum, and on the right side there was a general bulging of the abdominal wall in the iliae region. The cica-trices were firm.

A truss, consisting of a plate covering the whole right iliae region, was ordered, and has proved effective in supporting the weakened part.

The indications for the method of operation selected in the above case were shortly the following:

1. The opening in the intestine was very high up, as was evidenced by the rapid escape of solid and fluid nourishment, and the very considerable emaciation due to consequent defective nutrition.

2. The entire intestinal contents escaped by the abnormal opening, the discharge was constant, uncontrollable, and the cause of very great local irritation.

3. A plastic operation had already been tried, and had proved unsuccessful.

4. The opening of the lower end of the intestine could not be found, an insuperable objection to the application of Dupuytren's enterotome. The subsequent operation fully explained the difficulty in finding the lower opening.

As to the operation itself the case presents some points of novelty: 1, as to the method of provisional closure of the abdomen; 2, in the instruments used for provisional closure of the intestines; and 3, in the suture employed.

For the provisional closure of the abdominal cavity—a matter of extreme importance, considering the prolonged nature of the operation and consequent danger of cooling the parts, and the risk of the entrance of intestinal contents—several devices have been employed, the most effective of which is, perhaps, that of Madelung, of closing the wound in the walls with provisional sutures. The ordinary practice of closing the wound with sponges, adopted in ovariectomy, seemed to me the simplest;

that was therefore adopted, with the modification of substituting a number of small sponges attached to strings for the single large flat one, for which the comparatively small size of the wound was unsuited.

For the provisional closure of the gut to ensure the cardinal point, namely, prevention of the escape of intestinal contents into the wound, several plans have been adopted: 1, the use of a provisional ligature of stout catgut, carried through the mesentery in immediate proximity to the gut; 2, compression by the fingers of an assistant; 3, the pylorus-clamp of Rydygier; 4, the elaborate clamp of Mr. Treves; 5, the use of a pedicle-clamp, or the handles of an artery-forceps sheathed in india-rubber tubing.

To all these methods some disadvantages apply. The provisional ligature, or compression by fingers, allows possible strangulation on the one hand, or inefficiency on the other; the heat and tendency to dry the intestine being a further objection to digital compression. The clamps of Rydygier or of Treves necessitate perforation of the mesentery for their application—an unnecessary extra wound. Improvised clamps, made with handles of forceps, &c., do not work with parallel blades; while large clamps, such as are used in ovariectomy, are unnecessarily weighty, and hence cumbersome.

While thinking over my operation, it struck me that a very much more useful clamp could be manufactured on the model of the ordinary bull-dog forceps, by merely lengthening the blades and sheathing them with india-rubber tubing. I therefore had two pairs made by Mr. Millikin, adding a screw through the handles, by which additional compression can be applied if the spring be not sufficient. These forceps were used and proved eminently satisfactory, and I would claim the following advantages for them: 1. They are of small size and weight. No room is taken up by them, and they in no way interfere with the necessary manipulation for introducing the sutures. 2. There is parallel action of the blades, and hence even compression. 3. They necessitate no puncture of the mesentery.

The suture employed corresponds to Czerny's "Etagennaht," with the exception that in Czerny's suture the first row is carried through peritoneum and muscular coat, in the lower end of the gut, and through the whole thickness of the upper, with

a view to the avoidance of stenosis, immediate or remote. A large number of silk sutures, fifty in all, were introduced ; this is an important point in view of the large number of failures



Provisional clamp forceps.

due to subsequent escape of intestinal contents. The method of suture is very efficient, and, as far as can be seen, not capable of much improvement.

Lastly, as to the employment of any support in the lumen of the intestine during the introduction of the stitches, Mr. Treves' paper in the '*Medico-Chirurgical Transactions*,' led me to prepare myself with a collapsible india-rubber bag ; but, when the stage of suture was arrived at, the ease with which the stitches were introduced rendered the use of it unnecessary.

The course of the case to convalescence was so eminently satisfactory as to leave small room for comment, the only point requiring notice being the occurrence of the attack of hæmaturia. The absence of either blood or epithelial casts, together with the small amount of constitutional disturbance, allow this to be ascribed to simple congestion, induced by the concentrated condition of the urine, loaded with crystals of uric acid, consequent on the small amount of fluid nourishment administered, an error to be guarded against in any subsequent case ; it must be noted, moreover, that there was possibly some antecedent renal disease, since the presence of a small amount of albumen was recorded on admission. This was not discoverable later, and the patient had never had scarlatina.

The favorable issue of the case induced me to collect and examine the cases already recorded with a view to ascertaining the average percentage of failure and mortality, after the operation of resection, with the object also of comparing the results with those obtained by the older methods. I have succeeded without much difficulty in compiling a table of all the cases of resection published up to the current year, but with cases treated with the enterotome I have not been so fortunate,

the cases on record are spread over so many years that I have been unable to collect the details of a sufficient number. I shall, therefore, content myself with the often quoted results given by Dupuytren himself in his 'Leçons orales,' forty-one in number, merely referring to a second series collected by Heimann and quoted by Körte ('Berlin klin. Wochenschr.,' 1883, Nos. 51 and 52), which are unaccompanied by sufficient details to be of any use.

We will first turn to the all important question of mortality, and here apparently the enterotome has a very considerable advantage.

In 39 cases of resection we find 15 deaths, a percentage of 38·4, against 3 deaths in 41 cases with the enterotome, or only 7·3 per cent.

In face of so large a majority in favour of the enterotome, it will be necessary to examine closely the causes of death in each, and to endeavour to show that a considerable number of the fatal cases were due to causes which, with the improved methods now at our disposal, may be eliminated.

Nine cases (23 per cent.) died of septic peritonitis, in five instances due to faecal extravasation. In three of these extravasation took place at the mesenteric border, and in two the gut had been separated for some extent from its mesenteric attachment, in one to allow of invagination. Faecal extravasation, therefore, seems the chief factor here, and in most cases this is due to defective suture. Among the fatal cases Czerny's suture was only used once, hence there is room for hope that the wider use of this method may considerably lessen the danger of escape of faecal matter. The other point for especial care is the suture at the mesenteric border, which should be the starting point and combined with efficient closure of the gap in the mesentery itself. Madelung's experiments on animals, demonstrating as they do the fact that separation of the gut from its mesentery, even for a limited extent, almost invariably leads to gangrene of the gut freed, are sufficient argument for the discarding of any invagination method.

In four of the fatal cases stenosis of the lumen of the bowel is noted, twice at the point of suture once above it, and in one Ramdohr's invagination was the probable cause. In one the stenosis was independent of the suture, and might have been a

cause of death after any other operation, in the other two it must be presumably attributed to too much bowel wall being included in the suture. In three of these cases, therefore, the cause is one for possible future elimination. Temporary narrowing of the lumen at the scat of suture due to inflammatory thickening is no doubt the explanation of the constipation immediately following the operation noted in some of the other cases. In the fifth case the patient died from internal strangulation behind an old peritonal band, a cause not directly connected with the operation, and which a subsequent abdominal section was made too late to relieve. In two cases collapse is assigned as the cause of death, in one the patient was very weak prior to operation and died in a few hours, and in the other the collapse is ascribed to cooling of the belly contents due to the coldness of the room in which the operation was performed. The remaining two deaths are ascribed, one to pulmonary embolism, a result not specially connected with operations on the bowels, the other to exhaustion subsequent to total failure of the operation and re-establishment of the artificial anus. Taking, then, the causes of death as a whole it seems not unreasonable to hope for a considerable improvement in future statistics as a result of advance in our knowledge and improvement in technique especially as to suture.

In the fatal cases treated with the enterotome, peritonitis is the cause ascribed. In a second series of cases published by W. Körte (*loc. cit.*), only five deaths (4·8 per cent.) occurred in 104 cases.

Secondly, as to the percentage of failures, here the results, as would be expected, are much more favorable in the case of the thorough operation. Among the resection cases the patient was left with an artificial anus only three times, a percentage of 7·6. Of Dupuytren's 41 cases the anus persisted nine times, or 21·9 per cent. In Heimann's no information is given on this head, but in Körte's 12 cases two failures occurred, or 16·6 per cent.

The favorable nature of the statistics above quoted undoubtedly prove that in cases where the enterotome is applicable it is to be preferred in the present state of our knowledge, although it can hardly be denied that the prospect of a theoretically good result is more likely in the case of resection than

where the elamp is used, since the mode of cure obtained by the latter is merely the establishment of a cicatricial track. It is, moreover, probable that if the truth could be come at, the above statistics would prove much too favorable to the enterotome, both as to mortality and failures. So few cases have been published in this country, that no definite opinion can be formed, but the operation has always been regarded as a dangerous one. (For instance, Mr. Barker, 'Laneet,' 1880, vol. ii, p. 970, tells us that he could only hear of one case from his colleagues, and in that a speedy fatal termination took place), and in my own experience, limited certainly to two cases, it has entirely failed in doing more than effecting slight improvement. Again, in two cases included in my table of resections, it is mentioned that the enterotome had failed.

The rules to guide us in these cases as deduced from the above statistics would seem to be the following :

1. When no projection of the mesenteric border exists, a temporary tube, either of silver in two halves separable by a screw, or of india rubber, should be tried, and if after a sufficiently prolonged trial a satisfactory passage is established, a secondary plastic operation may be resorted to if necessary.

2. When both openings are readily found, but the passage of intestinal contents into the lower one is prevented by a 'spur,' Dupuytren's enterotome followed, if necessary, by a plastic may be tried.

3. If either of the former methods have failed, if the lower opening is not to be found, or if from the height of the fistula in the intestinal tract the patient is emaciating rapidly (since the average duration of Dupuytren's method varies from four months and a half to one year), resection is indicated. The application of the elamp is unsafe before the end of the second month subsequent to the formation of a fistula, since prior to that time the adhesions are not firm enough to bear interference without danger.

In looking up the cases of resection for artificial anus the series of like operations for gangrenous herniæ have necessarily come before me, and it seemed worth while to arrange them in a similar tabular form with a view to comparing the results with those done for the closure of fistulæ.

The operation is a sufficiently old one, having been performed

more than 130 years ago in Germany, shortly afterwards in France, and at a somewhat later date by Sir Astley Cooper. Sir Astley Cooper's cases were both fatal, although they survived the immediate operation. The operation seems to have been abandoned until recent advances in abdominal surgery have again brought it to the front.

In the tables below are 55 cases, with 29 deaths, a percentage of 52·7 against a percentage of 38·4 in cases of resection of artificial anus; the cause of death in the majority of cases being septic peritonitis. Here again, the deaths from this the most formidable cause are at the rate of 40 per cent., while in resections for artificial anus the percentage only reaches 28·2. Other details may be seen by consulting the table.

A comparison between the two classes of case under consideration is, of course, insufficient on the data to hand, since what we need is a list of fifty-five gangrenous herniæ treated in the usual manner; but a glance at the statistics serves to show the very great advantage of carrying out the resection of the intestine when it is in a comparatively normal condition, and hence they favour very decidedly the older method of establishing an artificial anus in cases where the condition of the gut precludes any idea of its return into the abdominal cavity. By the older method we not only obviate the disadvantage of putting the general peritoneal cavity in direct communication with a septic hernial sac, but are also saved meeting the difficulty of attempting to determine the exact limitation of morbid tissue when strangulation has been followed by gangrene.

Resections of Intestine

No.	Reference.	Operator.	Origin.	Age and sex.	Temporary compress.	Suture and material.	Length gut removed
1	Deutsch. Zeitschr. für Chirurgie, vol. ix, p. 521	Hüter	—	M. 43	Fingers	Lembert, catgut	—
2	Verhandl. Deutsch. Gesellsch. f. Chir., vol. vii, p. 78, 1879	Schede	Umbilical hernia, 3 weeks' standing	F. 43	Thick catgut ligature	"	Short
3	Ib.	"	—	F. 62	"	"	4 $\frac{3}{4}$ incl
4	Ib.	"	Fæcal fist. in linea alba, below umbilicus	F. 58	"	"	—
5	Wien. Med. Wochenschr., 1878, No. 49	Dittel	Femoral hernia	F. 47	—	Invagination, continuous suture, catgut	—
6	Ib., 1879, No. 1	Billroth	"	F. 33	—	Size of gut equalised by pleat	—
7	v. Langenbeck's Archiv f. klin. Chir., vol. xxiv	"	"	M. 16	Fingers	Silk	1 $\frac{3}{4}$ incl
8	Wien. Med. Wochenschr., 1881, No. 3	"	Inguinal hernia	M.	—	Silk, 17 sutures	1 $\frac{1}{4}$ incl
9	Ib.	Weinlechner	Femoral hernia	F. 50	Fingers	Silk	—
10	Verhandl. Deutsch. Gesell. f. Chir., vol. viii, 1879	Esmarch	Inguinal hernia	—	—	—	2 inch
11	Deutsch. Zeitschr. für Chir., vol. viii, p. 410	Schönborn	In descend- ing colon	M. 58	—	—	—
12	Berlin. klin. Wochenschr., 1881, No. 8	Thiersch	Inguinal hernia	—	Polypus forceps sheathed with india-rubber tubing, handles bound	Lembert-Kocher silk, 30	4 $\frac{3}{8}$ inch

or Artificial Anus.

Mesentery.	Persistence of fistula.	Cause of death.	Result.	Remarks.
—	—	Perforation, septic peritonitis	D.	—
—	6th day a small disch. of fæcal matter	—	C.	Gut retracted entirely within abdomen by 12th day.
—	—	Pulmonary embolism	D.	Pulmonary embolism on 4th day. No peritonitis.
—	—	—	C.	Bowels open on 4th day.
—	Slight escape of fæcal matter during first few days	—	C.	—
Wedge	—	—	C.	Bowels open on 3rd day.
—	—	—	C.	Bowels open on 4th day.
—	—	—	C.	Bowels open on 5th day.
—	—	—	C.	—
—	—	Peritonitis	D.	Death on 6th day. Perforation and escape of fæcal matter at mesenteric border.
—	—	Intestinal obstruction	D.	On day following operation symptoms of intestinal obstruction. Wound and gut laid open to allow free escape, but patient died on 4th day. No peritonitis.
Wedge	—	—	C.	Colic on 2nd day; flatus passed on 3rd day; bowels open on 9th.

No.	Reference.	Operator.	Origin.	Age and sex.	Temporary compress.	Suture and material.	Length of removal
13	Berlin. klin. Wochenschr., 1881, No. 20	Baum	Femoral hernia	F. 48	Forceps and fingers	Czerny	5½ inc
14	Deutsch. Zeitschr. für Chir., xv, pts. 3 and 4	Rydygier	A. anus followed blow in right ing. region	M. 46	—	Czerny, catgut, 40	2½ inc
15	Wiener Med. Presse, 1881, Nos. 17 and 19	Albert	Two faecal fistulae	M. 33	—	Two rows, very few in first row, catgut	2½ inc
16	Wiener Med. Wochenschr., 1881, No. 37	Schinzinger	—	F. 47	Fingers	Lembert, 6 catgut, 6 silk	1½ inc
17	Ib.	„	Inguinal hernia	F. 37	Fingers and a thin elastic band	12 catgut	2½ inc
18	Rydygier, Berlin. klin. Wochenschr., 1881, Nos. 41 and 43	Weiss	—	F. 23	Ligature	Lembert, invagination of upper end into lower, 20 silk	1½ inc
19	American Journal of the Med. Sciences, vol. liv, 1867, p. 105	Kinloch	Gunshot wound of gut	—	—	Invagination unsuccessful; (¼ up 1 row of ordinary sutures, 3 Lembert Czerny	2½ inc (¼ up 2 low
20	Die Drainirung der Peritonealhöhle, S. 219	Bardenheuer	Ing. hernia, 14 days' standing	—	—	—	Lar
21	v. Langenbeck's Arch. f. klin. Chir., vol. xxvii, p. 277	Madelung	—	—	—	Czerny, 14 catgut	9 inc (upper lower
22	Ib.	Gussenbauer	Inguinal hernia	—	—	Czerny, 35 and 8 silk sutures	6 inc
23	P. Reichel, Deutsche Zeitschr. für Chirurgie, vol. xix, 1884	Reichel	„	M. 35	—	Lembert, silk	—

Mesentery.	Persistence of fistula.	Cause of death.	Result.	Remarks.
Wedge	—	—	C.	Flatus on 2nd day; bowels open on 4th. Attack of parotitis during convalescence.
Mesentery split	—	—	C.	Flatus on 2nd day; bowels open on 8th. Pneumonia during course.
—	Fistula opened on 15th day; two others formed later; all healed spontaneously	—	C.	—
—	—	Collapse	D.	Very weak at time of operation. Vomited once. Gut completely healed.
—	—	—	C.	Flatus on 3rd day; bowels open on 13th.
—	—	Septic peritonitis	D.	Signs of obstruction. Death of peritonitis on 4th day.
—	Artificial anus reopened on 3rd day	—	C. not complete	Ligature through mesentery fixing bowel to abdominal wound. Artificial anus treated with Dupuytren's enterotome and improved.
Wedge	—	Fæcal extravasation	D.	Death on 9th day. Extravasation at mesenteric border.
"	—	—	C.	—
"	—	Internal strangulation	D.	Repeated attempts with Dupuytren's enterotome failed. Distension and vomiting; no sufficient action of bowels; no fever. Belly opened on 4th day; patient died 6 hours later. Strangulation by a peritoneal band, 5 inches below sutured spot.
Wedge; some difficulty with hæmorrhage	—	Septic peritonitis	D.	A length of gut loosened from mesentery, hence gangrene.

No.	Reference.	Operator.	Origin.	Age and sex.	Temporary compress.	Suture and material.	Length of gut removed.
24	P. Reichel, Deutsche Zeitschr. für Chirurgie, vol. xix, 1884	Reichel	Femoral hernia, wound of gut	F. 50	—	Lembert, silk	—
25	Ib.	„	Inguinal hernia	M. 61	—	„	6 in removed at the orifice
26	Ib.	„	„	F. 30	Fingers	Two rows, silk	1½ in
27	Ib.	„	„	F. 34	„	Czerny, silk	5½ in removed at the orifice
28	Ib.	„	„	M. 16	„	„	4 in
29	Ib.	Fischer	Femoral hernia	F. 32	—	Lembert, silk	6 in (3 f each)
30	Ib.	„	Umbilical hernia	F. 61	—	Czerny	8 in (4 f each)
31	Centralblatt f. Chirurgie, 1881, No. 30	Socin	—	F. 65	—	Lembert, 14 sutures	—
32	Verhandl. d. Deutsche Gesellschaft f. Chirurgie, vol. ix	Tauber	—	—	—	—	14 in

i-	Mesentery.	Persistence of fistula.	Cause of death.	Result.	Remarks.
	Mesentery fixed by thread to wound	—	—	C.	Operation two months after herniotomy. Bowels open 3rd day.
	—	Yes	—	R.; failure	Operation 4 months after herniotomy. Artificial anus re-established. Patient died a few months later from inanition. Failure due to stenosis and narrowing of lower end.
	Wedge, sutured with catgut	—	—	C.	Slow course. Constipation. Operation 2½ months after herniotomy.
	Wedge	Yes	Exhaustion	D.	Operation 5 weeks after herniotomy. Bowels open on 9th day. A faecal abscess formed, and a faecal fistula persisted until the discharge of a suture, then closed; but 3 months later a second abscess, followed by fistula. Stenosis at seat of suture: first abscess due to perforation above stricture; later a second perforation below, and hence temporary continuity of canal, later spoiled by contraction.
	"	—	—	C.	Bowels open on 9th day. Omentum removed at herniotomy. Stump left in canal.
	—	—	—	C.	4 inches excised at herniotomy. Operation for artificial anus 11 months later. Bowels open on 10th day. Subject to constipation after operation.
	—	Yes, from 2nd day	—	R.; failure	6 inches of gut removed at herniotomy. Operation for artificial anus 2 months later. Signs of obstruction on 2nd day; sutures removed, and artificial anus re-established. Discharged with a fistula and subject to constipation. Died 1 year later with pneumonia.
	Wedge	—	Septic peritonitis	D.	Lived 15 hours. Pulmonary emboli.
	—	—	Peritonitis	D.	Stenosis of upper end of bowel.

No.	Reference.	Operator.	Origin.	Age and sex.	Temporary compress.	Suture and material.	Length of gut removed
33	Centralblatt für Chirurgie, 1882, No. 21	Novaro	Inguinal hernia	M. 40	Ligature	Czerny, catgut	$\frac{3}{4}$ inch
34	Ib., No. 41	Juillard	Femoral hernia	—	—	—	—
35	Ib.	„	Inguinal hernia	—	—	—	—
36	Deutsch. Med. Wochenschr., 1883, No. 1	v. Bergmann	Internal strangulation; enterotomy	M. 16	—	Czerny, 60 stitches	—
37	Ib., No. 15	Bardeleben	—	—	—	—	—
38	Deutsche Zeitschrift f. Chirurgie, vol. xix, 1884. P. Reichel	Fischer	Femoral hernia	F.	Fingers	Czerny, silk	2 inches
39	—	Makins	Inguinal hernia	M. 20	Forceps	Two rows outer Lembert, 50 silk	4 inches

si-	Mesentery.	Persistence of fistula.	Cause of death.	Result.	Remarks.
	—	—	Pneumonia; local peritonitis	D.	Mesentery freed $1\frac{1}{4}$ inches from gut (lower end). Stitches gave way which were put in mesentery.
	—	—	—	C.	Bowels open on 8th day. Fistula had existed 2 years.
	—	—	—	C.	Bowels open on 7th day. Artificial anus had existed 2 months. Lower end contracted to a pin's point, and lay free in belly.
	—	—	—	C.	Bowels open on 10th day. Anus at junction of ileum and colon. Ileum sutured to lower end of colon in neighbourhood of vermiform appendix.
	—	—	Peritonitis	D.	Not published; mentioned only in a discussion on subject.
	Wedge	—	Collapse	D.	Herniotomy, $3\frac{1}{4}$ inches of gut resected, and artificial anus established; 19 days later operation to close it. Operation lasted $1\frac{3}{4}$ hours in cold room. Patient died on 3rd day. Pulmonary embolism. Clot in internal saphena and femoral; former ligatured close to latter.
s	„	—	—	C.	Hæmaturia for 2 days, commencing on 7th day, due to irritation from concentration of urine, as result of small amount of fluid taken.

Resections of Intestine

No.	Source.	Operator.	Nature of hernia.	Age and sex.	Temporary compress.	Suture and material.	Length of gut resected.
1	Haller, Disputat. Anat. Göttingen, 1751, vol. vi, p. 745	Ramdohr	Inguinal hernia; abscess	—	—	Invagination	2 feet
2	Observat. et Remarques de Chir. prat., Mannheim, 1767, obs. x, p. 260	de Vermale, Redinond	Inguinal hernia	—	—	„	2 inches
3	Louis, Mémoires de l'Acad. Roy. de Chirurgie, 1757, vol. iii, p. 188	Duverger	„	—	—	3 stitches	2 inches
4	Haller, Bib. Chir., 1775, vol. ii, p. 457	Jos. Schmidt	„	—	—	—	6 inches
5	'The Anatomy and Surgical Treatment of Abdominal Hernia,' 2nd edit., London, 1827.	Astley Cooper	Femoral hernia	—	—	3 stitches	2½ inches
6	Ib.	„	Femoral hernia, rupture into sac	—	—	3 sutures, ends left out of wound	¾ inch
7	Ib.	Nayler	Inguinal hernia	—	—	—	4 inches
8	Handbuch der Chir., transl. by Textor, 1796	Boyer	„	—	—	Invagination, Ramdohr	4 inches
9	Journ. Gén. de Méd. et Pharm., 1810, t. xliii, p. 176	Lavielle, fils	Inguinal hernia, rupture	—	—	„	12 inches
10	Caspar's Wochen-sch. f. d. Gesamt. Heilk., 1836, No. 26	Dieffenbach	Femoral hernia	—	—	Continuons, Lembert	3 inches
11	v. Langenbeck's Arch. f. klin. Chir., xix, S. 410, 1875	v. Langenbeck	Inguinal hernia	—	—	Invagination, 8 catgut, Lembert's	8 inches
12	St. Petersburg Med. Woehensehr., 1879, No. 27, S. 253	Wahl	„	—	—	Lembert, 10 catgut	6 inches

for Gangrenous Hernia.

entry.	Reposi- tion.	Fæcal fistula.	Cause of death.	Result.	Remarks.
edge	Yes	—	—	C.	Bowels open on 2nd day. Sutured spot fixed to neck of sac. Died 1 year later from pleurisy.
—	—	—	—	C.	Sutured spot fixed to neck of sac. Slight discharge from wound 3 to 4 weeks. Bowels open normally.
—	—	—	—	C.	Ends joined over a piece of calf's trachea, which was discharged per anum on the 21st day.
—	—	—	—	C.	—
—	—	—	—	D.	An opening was left through which fæces escaped. No normal action of the bowels. Gut adherent to neck of sac.
—	—	8th day	—	D.	An artificial anus established itself on the 8th day. No action of bowels. Death occurred 2 months later from exhaustion and closure of artificial anus.
—	—	Yes	—	R.; art. anus remain- ing	Stitches removed on 2nd day after this escape of fæces by wound. On 10th day sutures replaced, but they again broke away.
—	Yes	—	Septic peritonitis	D.	Gut joined on a cylinder of cardboard. Death 6 hours after operation.
—	—	—	—	C.	Upper end of bowel fixed to wound; after evacuation of contents, 12 hours later, invagination and suture; gut kept fixed to wound. Bowels open on 2nd day.
edge	—	—	—	C.	Death 4 weeks later from internal strangulation.
—	—	—	Delirium tremens	D.	Suture line healed.
edge, utures	Not com- plete	—	Peritonitis	D.	Death on 7th day. Sutures efficient.

No.	Source.	Operator.	Nature of hernia.	Age and sex.	Temporary compress.	Suture and material.	Length of gut removed.
13	Die Drainirung der Peritonealhöhle, 1881, S. 218	Bardenheuer	Inguinal hernia, rupture	—	—	Czerny	—
14	Madelung, Langenbeck's Archiv, xxvii, p. 284	Küster	Inguinal hernia	—	—	Lembert, catgut	2 inches
15	Ib.	Gussenbauer	Inguinal hernia, rupture	—	—	Lembert, 19 sutures	7½ inches
16	Ib.	Tändler	Femoral hernia	F. 52	—	10 sutures between serous and mucous coats	4½ inches
17	Ib.	Billroth	„	M. 60	—	Two rows, 2nd Lembert	2 inches
18	Correspondenzbl. f. Schweiz. Aerzte, 1875, No. 5	Kocher	„	F. 45	—	Interrupted, not through whole thickness, 5 catgut	5½ inches
19	Verhandl. Deutsch. Gesellsch. f. Chir., vol. viii, 1879, p. 83	Küster	„	—	—	Lembert, catgut	1½ inches
20	Ib.	„	„	—	—	Lembert, 1 continuous catgut	—
21	Wiener Medecin Blätter, 1876, Nos. 6 and 7	Nicoladoni	„	—	Polypus forceps, sheathed	Lembert, silk	—
22	Deutsch. Zeitsch. für Chirurgie, vol. xii, No. 3	Lücke	„	F. 54	Fingers	Invagination, modified Ramdohr	2½ inches
23	Bulletin de la Suisse, May, 1880	Kocher	Inguinal hernia	—	—	Lembert, 8 catgut	18½ inches
24	Centralbl. für Chirurgie, 1880, p. 465	„	Femoral hernia, 2 days	F. 55	Billroth's large artery forceps	„	4½ inches
25	Wien. Med. Presse, 1880, No. 23	Ludvik	Femoral hernia, 5 days	F. 60	—	Invagination, 20 catgut sutures	5½ inches
26	Verhandl. Deutsch. Gesellsch. f. Chir., 1880, p. 64	Hagedorn	Femoral hernia, 2 days	F. 68	Provisional ligature with stout catgut	Lembert, close catgut	6½ inches

Mesentery.	Reposition.	Fæcal fistula.	Cause of death.	Result.	Remarks.
—	Yes	Temporary	—	C.	Peritonitis. Abortion during course. Artificial anus formed, and healed up after 4 months.
—	—	—	Peritonitis	D.	Patient lived 8 hours.
Wedge	—	Temporary	—	C.	Fæcal fistula opened on 6th day; healed spontaneously on 14th.
—	Yes	—	Peritonitis	D.	Sac extirpated. On 5th day got out of bed and stole food. Death on 6th day. Gangrene of gut in neighbourhood; all sutures had given way.
—	—	Temporary	—	C.	Small fæcal fistula closed spontaneously 3 weeks after operation.
Wedge	Yes	„	—	C.	Resection 1 day after herniotomy. Small fæcal fistula opened on 8th day; closed on 14th.
„	Yes	—	Septic peritonitis	D.	Collapse on 2nd day. Two stitches gave way, and extravasation occurred.
—	Yes	—	„	D.	On drawing on gut immediately after operation sutures gave, and extravasation into peritoneum occurred.
—	Yes	—	—	C.	Drainage to neck of sac. 6th day simple enema.
—	Yes	—	Septic peritonitis	D.	Herniotomy. Resection on 8th day. Narrowing of lumen due to method, found P.M.
—	Yes	—	—	C.	Flatus passed on 2nd day; bowels open on 12th.
—	Yes	—	Septic peritonitis	D.	Flatus passed on 3rd day. Fæcal abscess at line of suture; gangrene of gut extending 4½ inches above suture.
Mesentery cleated	Yes	—	—	C.	Sac and omentum excised. Bowels open on 4th day.
—	Yes	Temporary	—	C.	Fæcal fistula from 5th day; protracted cure in water bath.

No.	Source.	Operator.	Nature of hernia.	Age and sex.	Temporary compress.	Suture and material.	Length of gut removed.
27	Verhandl. Deutsch. Gesellsch. f. Chir., 1880, p. 64	Hagedorn	Femoral hernia, 36 hours	F. 40	Provisional ligature with stout catgut	Lembert, close catgut	2 inches
28	Deutsch. Medecin Wochenschr., 1880, S. 558	Heusner	Inguinal hernia, 8 days	F. 73	—	Invagination, 10 catgut	4 $\frac{3}{8}$ inches
29	Berlin. klin. Wochenschr., 1880, Nos. 45—48	Czerny	Femoral hernia, 3 days	F. 43	Fingers	Czerny, 24 silk	4 $\frac{3}{8}$ inches
30	Ib.	„	Inguinal hernia	F. 49	„	Czerny	2 $\frac{1}{4}$ inches
31	Wiener Med. Wochenschr., 1881, No. 5	Wölfler	Femoral hernia, 2 days	F. 65	„	2 rows, 25	6 $\frac{3}{8}$ inches
32	Prezeglad Lakarski, 1881, Nos. 22 and 23	Bryk	Fem. hernia, 10 days, rupture	F. 36	—	Lembert	5 $\frac{1}{4}$ inches
33	Ib.	„	Inguinal hernia	M. 29	Sheathed forceps	„	5 $\frac{1}{4}$ inches
34	Berlin. klin. Wochenschr., 1881, No. 29	Roggenbau	Femoral hernia	F. 74	Fingers	Czerny, silk, 11 first row, 10 second	14 $\frac{5}{8}$ inches
35	Centralbl. f. Chirurgie, 1881, No. 24	Juillard	—	—	—	Invagination and Lembert, 13 catgut	6 $\frac{3}{8}$ inches
36	Samml. klin. Vorträge, No. 201	K. Jaffe	Littre's hernia	F. 52	—	Oblique section of smaller end; Czerny, 24 catgut	5 $\frac{1}{4}$ inches
37	Berlin. klin. Wochenschr., 1881, No. 43	Rydygier	Femoral hernia, 3 days	F. 58	R.'s elastic pylorus compressor	Czerny, catgut	24 inches
38	Ib.	Weiss	Femoral hernia, rupture	F. 47	Provis. ligature	Lembert, 10 supf., fine silk	4 $\frac{3}{8}$ inches
39	Centralbl. f. Chirurgie, 1881, No. 46	Moldenkow and Minin	Inguinal hernia, rupture	M. 21	—	Lembert, 25 catgut	—
40	Ib., No. 52	Roser	Femoral hernia	—	—	Two rows	—

Case.	Reposition.	Fæcal fistula.	Cause of death.	Result.	Remarks.
—	Yes	Temporary	—	C.	Fæcal fistula on 6th day; closed spontaneously.
Edge	—	—	Septic peritonitis	D.	Fæcal extravasation; stitches loose.
Edge, Sutures	Yes	—	—	C.	Flatus passed 1st night; bowels open on 8th day. Neck and sac extirpated.
—	—	—	Asphyxia	D.	Fæcal vomit inspired during anæsthetisation.
—	Yes	—	Septic peritonitis	D.	Probable escape of fæces on drawing loop down. Sutures efficient, but some stenosis. Patient lived 6 hours.
—	Yes	—	—	D.	Lived a few hours only.
—	Yes	—	Carbolic acid poisoning; inflammation of lungs	D.	Lived 7 days; continual vomiting. Bowels open on 7th day.
—	Yes	—	—	C.	Bowels open on 5th day.
Edge, Sutures	—	—	—	C.	Bowels open on 8th day. Patient a lunatic.
Edge, Sutures	Yes	—	—	C.	Excision of sac, suture of neck. Bowels open on 4th day.
—	Yes	—	Septic peritonitis	D.	Lived 20 hours. No escape of fæces. Bowels open with enema.
—	Yes	Yes	Exhaustion	D.	Died one month later.
Suture, Sutures, Sutures	Yes	—	—	C.	Extirpation of sac. Bowels open regularly from 3rd day.
—	Yes	—	Valve at sutured spot	D.	—

No.	Source.	Operator.	Nature of hernia.	Age and sex.	Temporary compress.	Suture and material.	Length of gut removed.
41	Dentsch. Zeitschr. f. Chir., X. Reichel, vol. xiv, p. 232 <i>et seq.</i>	Fischer	Lumb. hernia 5 days; ruptured during op.	F. 56	—	Lembert silk	9½ inches
42	Ib.	Reichel	Femoral hernia, 6 days	F. 55	—	Lembert	2 inches
43	Ib.	„	Inguinal hernia	F. 47	Fingers	„	2½ inches
44	Ib.	„	Inguinal hernia, 3 days	M. 35	„	„	17 inches
45	Deutsch. Medecin. Wochenschrift, 1877, No. 10	Viertel	Femoral hernia	F. 56	—	Lembert, 15 silk	1½ inches
46	Hygeia, xliii, 12	Aman	„	F. 63	Provisional ligature	Czerny, 16	—
47	Medical Record, 1882, vol. xxii, No. 16	Fulles	—	—	—	—	—
48	Ib.	„	—	—	—	—	—
49	Deutsch. Medecin. Wochenschr., 1883, No. 15	Bardeleben	—	—	—	—	—
50	Ib.	Bardeleben	—	—	—	—	—
51	Berlin. klin. Wochenschr., 1881, No. 43, Rydygier	Obalinski 3, Korzeniowski 1, Kosinski 1	—	—	—	—	—
52							
53							
54							
55							

mentery.	Reposi- tion.	Fæcal fistula.	Cause of death.	Result.	Remarks.
—	Yes	—	Septic peritonitis	D.	Escape of fæcal matter into belly during operation; disinfection.
edge	Yes	—	„	D.	Death on 3rd day. Artificial anus not established on account of smallness of opening. Rupture into sac. Omentum removed. Sac extirpated. Carboloria.
„	—	—	—	C.	Bowels open on 4th day. Gut only gangrenous in ring exactly oppo- site neck.
—	Incom- plete	Yes	—	R. Incom- plete	Gut not wholly replaced, because adherent in canal. Gut ruptured during manipulation. Pain and vomiting 1st night; fæcal on 3rd day. Wound opened; gut punc- tured above suture and fæces evacuated. Later fæces escaped, partly by wound, partly per anum.
edge	Yes	—	—	C.	Provisional fixation of both ends to wound. Wound left open.
edge. sured layers	—	—	Septic peritonitis	D.	Died in 17½ hours. Suture firm.
—	—	—	—	C.	—
—	—	—	—	C.	—
—	—	—	Septic peritonitis	D.	Death in 36 hours.
—	—	—	„	D.	Death in 36 hours.
—	—	—	—	{ D. D. D. D. D. }	Verbal communication to Rydygier. No particulars given.

